



Part 2: Characteristics of Landfill Gas Utilization Projects

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Presentation Outline

- Determining if a site is a good candidate for landfill gas utilization
 - Site Characteristics
 - Waste Type and History
 - Site Conditions
 - Utilization Options
 - Community Acceptance
 - Other factors



Site Characteristics



- Site Location
 - Landfill still receives waste (or is recently closed)
 - Landfill is near the power grid or industry that could use the gas
 - Landfill has land available for alternative applications
- Site Acceptance
 - Landfill gas utilization project is accepted by the local government and community



Determining Methane Production Potential



- Quantity of Waste in the Landfill
 - 1.2 million metric tons of waste in place
- Waste Composition
 - Organics produce high quantities of methane
- Waste Placement History
 - Older waste produces less methane



Site Conditions

- Status of Landfill Operation
 - Open
 - recently closed (less than 5-7 years)
- Landfill Type
 - Managed Landfills
 - ◆ daily cover
 - ◆ compaction
 - ◆ final cover
 - Open Dumps
 - ◆ present challenges
- Landfill Depth
 - greater than 10 meters



Climate and Moisture Levels



- Climate
 - More than 10 cm of rain annually
- Management of Moisture in the Landfill
 - Leachate Management
 - Landfill Stability



Other Considerations

- Geology/
Hydrogeology
 - Lined landfill site
 - Unlined landfills produce higher methane generation if located in soils that have low permeability, such as clay
- Temperature
 - methane production is maximized between 50–60 degrees Celsius



Brazil: Ideal for Landfill Gas Utilization



- Brazil has many landfills
- High levels of waste continue to go to landfills
 - Brazil generates 240,000 tons/day
 - Growing industrialized product consumption
 - 70% of waste generated is collected for disposal
 - Less than 2% recycling

Brazil: Ideal for Landfill Gas Utilization



- Moisture Level of Waste
 - The municipal waste in Brazil has high moisture content due to more organic materials
 - Approximately 60% of waste from Brazil's capital is organic.
 - Over 50 cm /rainfall per year in northern Brazil
 - Over 100 cm /rainfall per year in southern Brazil
- The high amounts of organic compounds and rainfall produces more methane rapidly, but over a shorter period of time.



Brazil: High Energy Demands

- Electricity consumption: 336.242 bilkW h
- Electricity productivity by source:
 - Fossilfuel: 4.92%
 - Hydro: 91.02%
 - Nuclear: .99%
 - Other: 3.07% (1998est)
- With continued economic expansion of about 4% per year requiring energy resources to grow by 65% from 1996-2006, Brazil's runs the risk of increasing energy dependency on fossilfuel or hydropower dams



Brazil: High Energy Demands

- Energy Crisis
 - Consumption by 20% over the next 6 months
 - Conservation measures went into effect June 1
- Global News Coverage
 - Energy Crisis Leaves Brazil in Perpetual Twilight
 - ◆ Monday, June 18, 2001, Reuters News Service
 - Energy Crisis in Brazil is Bringing Dimmer Lights and Altered Lives
 - ◆ Monday, June 6, 2001, New York Times
- Landfill Gas can help offset some of Brazil's energy needs

Utilization Options for the Landfill Gas



- Are there uses for the energy recovered... A Test
- Direct Use
- Electricity Generation
- Gas Processing
- Emerging Technologies



Are There Uses For The Energy Recovered?



- Ask yourself these questions, are there...
 - 1) Residential areas that could use a supplemental source of fuel?
 - 2) District heating plants that can use medium quality gas?
 - 3) Industrial facilities nearby that can use medium quality gas?
 - 4) Medium-quality gas distribution networks?
- Additionally ...
 - 5) Are high-quality gaseous fuels very costly, making gas processing potentially cost effective?
 - 6) Are there electric power distribution systems that do (or can) obtain power from projects such as landfills?
 - 7) Would you consider gas recovery as a best-cost alternative approach for reducing methane emissions even if it is not profitable in its own right?

Identify Other Favorable Options



- Find Supportive Project Partners
 - Regulatory Agencies
 - Utility Companies
 - Governmental Agencies
 - Private Industry
 - Adjacent Land Owners and Residents
 - Multi-Lateral Banks
 - Financial Institutions

